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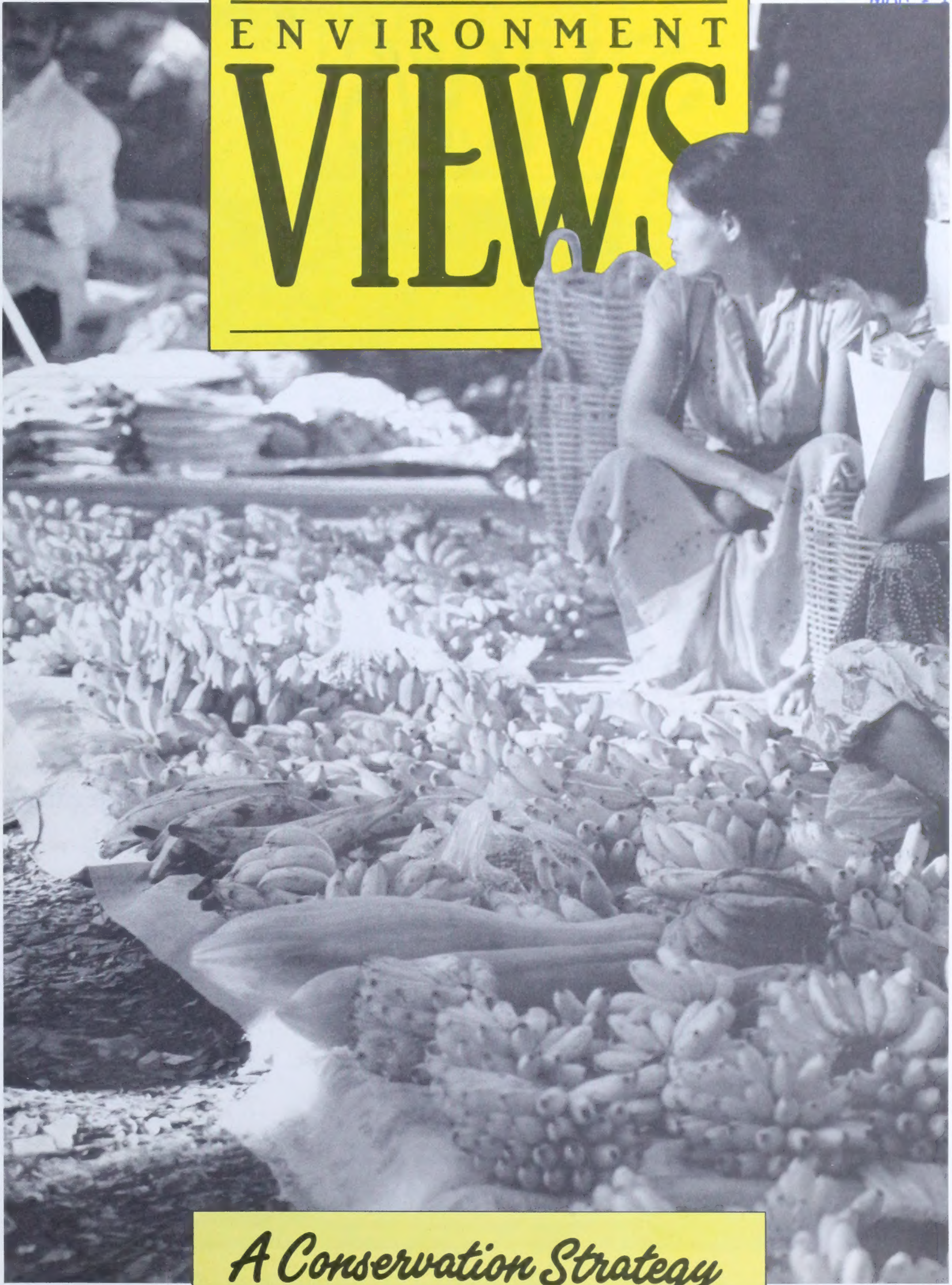
ENVIRONMENT VIEWS



A Conservation Strategy

ENVIRONMENT
VIEWS

*Cover photo by Nancy Finlayson
Sabah Sunday market, Tuaran, East Malaysia.*

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Environment Views is published quarterly by Alberta Environment. Each issue deals with a specific topic from various viewpoints with the aim of increasing awareness of environmental issues among Albertans. *Environment Views* is directed by an independent board with representation from environmental groups, government and industry. The views expressed by the publication are not necessarily those of Alberta Environment.

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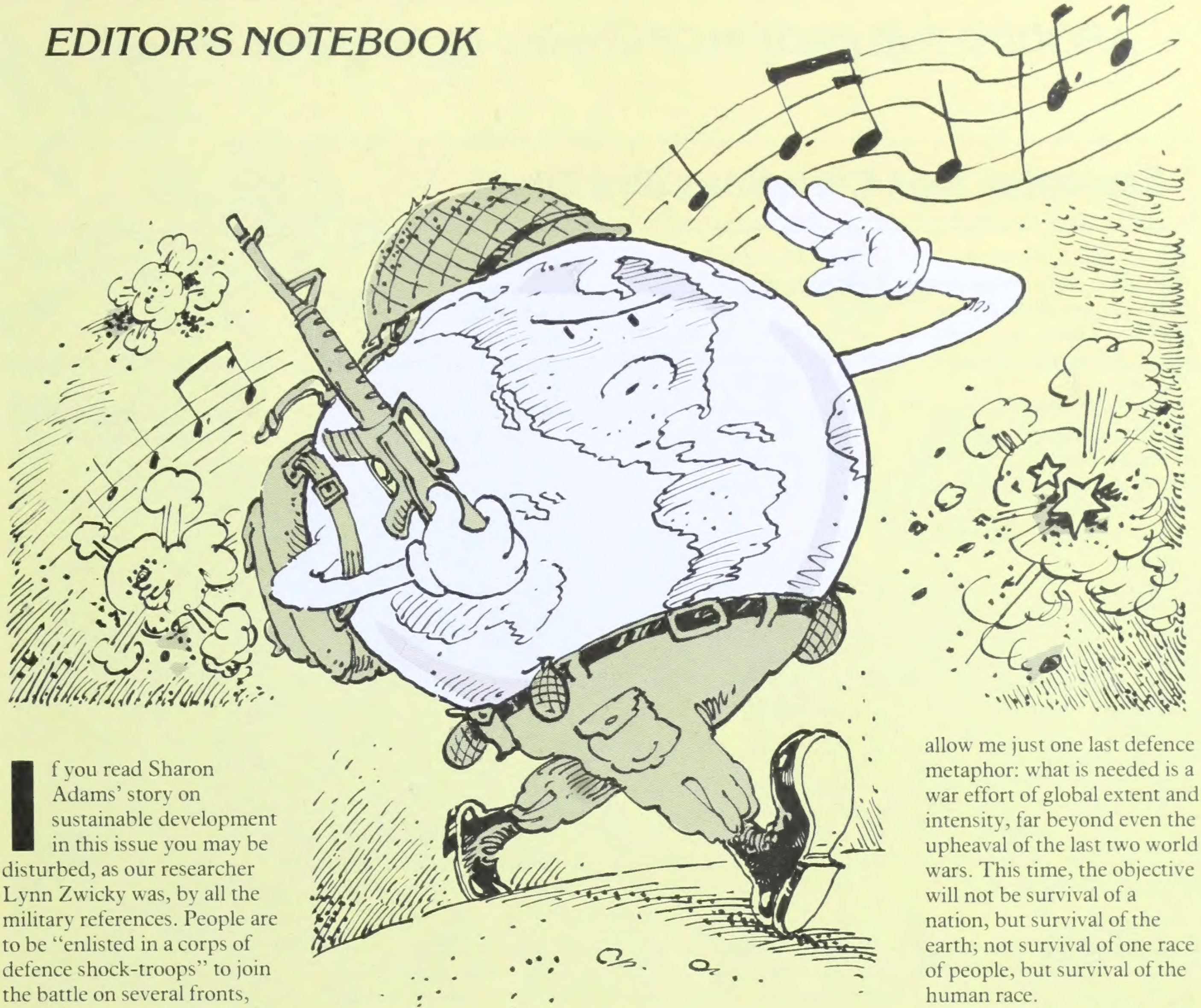
ENVIRONMENT
Alberta

EDITOR'S NOTEBOOK



If you read Sharon Adams' story on sustainable development in this issue you may be disturbed, as our researcher Lynn Zwicky was, by all the military references. People are to be "enlisted in a corps of defence shock-troops" to join the battle on several fronts, and so on. Myself, I find the military metaphor rather an apt one. On all fronts, the old planet is under seige, and I don't believe what's needed to turn the Earth's fortunes around is more studies and reports and theories. Action is what is needed, and on a massive scale. We will have to wage the equivalent of a global war against neglect, waste, misuse, corruption and (that fiercest villain) apathy.

It seems to me that the World Conservation Strategy has the potential to be a meaningful call to arms, and if there is any hope of winning the war to save the wetlands, the topsoil, the rain forest, and the ozone layer, it will only be through the kind of global marshalling of the troops that the World Conservation Strategy calls for.

The WCS is simple, really. World governments must agree on what resources are vital to a sustainable global ecosystem, what should be done to save them, and who should do it. There must be international co-operation, buttressed by international law and practices and financial support. But wisely, this vision is not to be imposed from above. Nations, and within them regions, states and provinces, are to identify local priorities for environmental protection and what action should be taken. A kind of reverse pyramid selling, for the good of the planet we will be leaving for our children. Development decisions are to be made considering environmental criteria, not just economics.

Simple on paper, perhaps, but in practice a radical departure from the way we have been doing business, especially over the past few hundred years when the greatest environmental damage has been done. To allow me just one last defence metaphor: what is needed is a war effort of global extent and intensity, far beyond even the upheaval of the last two world wars. This time, the objective will not be survival of a nation, but survival of the earth; not survival of one race of people, but survival of the human race.

It's tempting when faced with issues of this magnitude to leave it up to the diplomats and the professionals, but the beauty of the WCS is its structure, which relies on people like you and me to get involved at the local level, to help in the planning process, to lobby politicians and to declare by our actions our committment to a sustainable future. We hope you will read this issue carefully: there are lots of stories about what needs doing, but also some good news about what has been done and how the individual can make a difference.

The editor of Environment Views, *Maryhelen Vicars, is a freelance writer and editor based in Edmonton.*

AROUND THE PROVINCE a review by Gail Helgason

Edmonton tops Christmas Bird Count

Edmonton achieved the highest participation rate in the country in the Boxing Day Bird Count, with more than 1,200 persons sighting 135 species.

Red Deer scored the third highest participation rate, behind Victoria which recorded the greatest number of species — 145.

Ten thousand people took part across Canada, twice as many as in the previous year, says naturalist Joy Finlay of Sherwood Park, one of the originators of the count.

"The Christmas Bird Count is the largest wildlife census in the world," she notes. "This year we reached a new high."

Unusual sightings in Alberta included a Brewer's Blackbird and a robin in Fort McMurray and warblers in Calgary. Five communities reported more than 50 species.

Finlay noted that last year, Edmonton set a world record for Bohemian waxwings, with 25,443 seen in one day. This year only 620 were counted, probably because the May snowfall prevented a bountiful berry crop.

The bird count was part of Canada's first National Bird-Watching Weekend, officially declared this year as a salute to Wildlife '87. Weekend activities by naturalist clubs included promotion of bird feeder programs as well as the count itself.

Finlay, chairman of the national Wildlife '87 Committee, said the bird-watching weekend was the ideal way to wind up Wildlife '87. The year paid tribute to 100 years of wildlife conservation in Canada, which began in 1887 with the establishment of the first migratory bird sanctuary at Last Mountain Lake in Saskatchewan.

Although complete statistics of new wildlife projects were not tabulated, Finlay says "an unprecedented number" were launched in Alberta in 1987.

They include completion of 170 projects under the Buck for Wildlife Program, established to protect and enhance wildlife habitat. Many communities and clubs undertook their own projects, ranging from wildlife film festivals to bird-feeding projects.

More than 2,000 Junior Forest Wardens, for example, became directly involved in habitat improvement through the year. Another 50 volunteers are now assisting as "stewards" of ecological reserve areas.

Finlay noted that the provincial government established numerous natural areas during the year as part of its commitment to Wildlife '87: "In Alberta at the start of 1987, there were 92 natural areas consisting of 18,000 hectares. At the end of 1987 we had 113 natural areas consisting of 35,000 hectares."

She adds: "We hope the spirit of Wildlife '87 will gain momentum to carry on with conservation for the next century."

Thirsty grass dries out sludge

A Vegreville soils scientist is banking on the potential of grass to transform massive sludge ponds in the Fort McMurray area into productive land.

Although most of the research done so far has been on a small scale, field experiments begun this winter should indicate whether the concept of "biological dewatering" will work on a larger scale.

Richard Johnson, a soils scientist at the Alberta Environmental Centre in Vegreville, says the idea of using plants to dry up excess moisture is not new.

But up to now, it has not proven practical for drying up large areas of "sludge", the thick, grey waste product which goes into tailing ponds after companies such as Syncrude Canada Ltd. extract bitumen from the oil sands.

These tailings ponds cover areas as large as 23 square kilometres and as deep as 50 metres. At the deepest level, the sludge is over 40 metres thick.

"It won't drain any further," says Johnson. "We are left with a very soupy mess, which represents an environmental danger to wildlife."

The idea of using biological dewatering in the oil sands began in 1984, when Syncrude approached the Alberta Envionrmental Centre for assistance in reclamation development.

Johnson's group looked at about 50 species of plants which appeared promising. They were seeking species which would not only suck up moisture but could also survive in a cold climate.

Eventually they whittled the possibilities down to two — common dock and reed canary grass. The two species, which both have broad leaves and a deep root system, proved successful in test plots. However, the group ran into difficulty when it found that seeds were sinking too far into the sludge to take root.

That problem was solved by freezing the test plot to remove some of the sludge. The freeze-thaw cycle reduced enough water from the sludge that seeds could be sown and the dewatering process completed.

That concept proved "very encouraging" and is now being tested in two large pits, of about 28 square metres. Mr. Johnson says his team should soon know whether it could be applied on a large scale, taking advantage of cold winters in the area.

"The implications are enormous," he says, noting that trees could perhaps be grown on areas which are now virtually useless and pose an environmental hazard.

Improved reclamation methods are vital because of the increasing volumes of sludge being produced through oil sands extraction. Syncrude alone produces about 15 million cubic metres of sludge per year, says Johnson.

"We're getting right to the heart of the problem," he says. "No one else in the world is doing this."

Eric Bailey

PUTTING THE SQUEEZE on the Environment

The need for conservation is worldwide

NANCY FINLAYSON

While rain forest is rapidly dwindling around the world, some like this East Malaysia national parkland, has been identified for preservation.

The domino theory of environmental ruin is dead. The idea that one event triggers another which in turn triggers another and so on in a simple line doesn't really describe the problem. There may be many causes for a single event and a single event may only be part of the cause of another event. Conserving life looked easier when we thought if we propped up a single domino in the right place we could protect all the others. Really, it's more like squeezing a kid's balloon — just as you put pressure on one area, things get bigger somewhere else.

And things aren't just environmental problems anymore. We've damaged the biosphere so badly that national economies, social support systems, human health and international trade have begun to suffer markedly. We've messed up the sandbox so much we can't play in it anymore.

According to Robert Prescott Allen, the Canadian environmentalist who wrote *How to Save the World*, the official layman's version of the World Conservation Strategy (WCS), we have brought about a "virtually permanent reduction in the productive and regenerative capacities of the earth."

Many if not most of us in North America still think the damage can be repaired through care, time, money and technology. As soon as our present economic and political crises are over, we can turn our attention to fixing the environment. But the economic and political crises of the world are, in fact, environmental crises and seeing the interrelationships is one of the first steps to conservation.

Oil is a good, familiar Albertan example.

If the price of oil goes down, the Alberta economy slows down, causing social and economic troubles for individuals, families and communities large and small. The solution to this economic problem is higher oil prices. But this is an environmental problem.

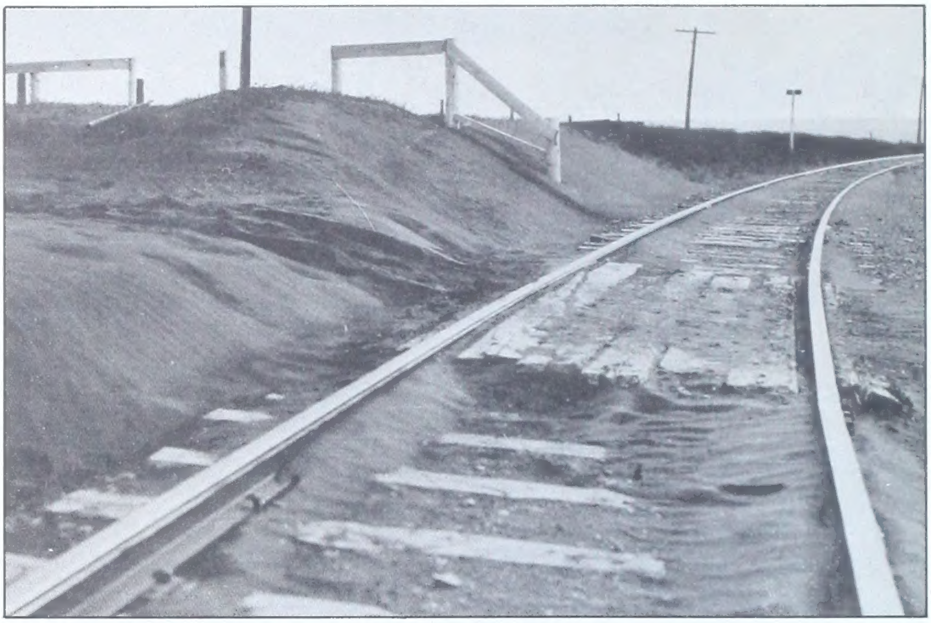
If oil prices go up, fewer rural folk in developing nations can afford kerosene to heat their homes. So, they burn wood, dung and crop waste instead. This denudes forests and shrubland at an increasing rate, encouraging increased soil erosion and robs the soil of fertilizing animal wastes and vegetable fibre. As chemical fertilizers are largely based on oil products (and consequently prohibitively expensive when oil prices are high), nothing will be used to replace the natural fertilizers. To countries mired in heavy debt, reduced farm productivity only worsens their national economy, balance of payments and, in too many cases, speeds up the spread of desert land in areas once marginally productive.

The crazy thing is that low oil prices are a problem too. We burn fossil fuels at a greater rate, polluting our air, acidifying our soils and lakes, and depleting a nonrenewable resource more quickly. We find our zeal and commitment for finding alternative, renewable sources of energy reduced and we take a less eager approach to energy conservation. And, by early in the 21st century, the resulting greenhouse effect of all this fossil fuel burning will probably be playing havoc with farming practices all over the world and flooding most of our coastal plains. All of this will have massive economic and social effects. Painful effects.

> *We have brought about a "virtually permanent reduction in the productive and regenerative capacities of the earth."*

"We have reached a turning point at which, depending on if and how we act, matters will be resolved for the better or worse," says Allen. "Human beings now have to live on a planet whose carrying capacity for all practical purposes is irreversibly less now than it was previously. Unless concerted action is taken immediately, there will be a further decline in the planet's capacity to support its population."

In considering how we might go about saving the world before it's too late, the framers of the WCS compiled a catalogue of ills, a global what's-rotten-in-the-state-of-the-environment list. A skim through what they uncovered makes a backdrop for considering priorities for saving our own environment.



GOVERNMENT OF ALBERTA

Agricultural Areas

The WCS says that for every increase of 1,000 in Canada's urban population, 320 hectares of one of the world's main grain suppliers disappears. Between 1961 and 1971, more than 8,000 square kilometres of Canada's prime farm land was lost through urbanization. The loss of crop land anywhere poses the greatest threat to people in developing nations. An official of the U.S. Department of Agriculture figures one hectare of U.S. farm land now feeds one human being somewhere in the world. Every hectare lost is another person who goes hungry.

More than half of India suffers from some form of soil degradation: erosion, floods, salinity and alkalinity. At the same time, more nutrients are lost from the soil than the amount applied as fertilizer. If current rates of land degradation continue, close to one-third of the world's arable land will be destroyed by the year 2000. Loss of soil, particularly through wind and water erosion, is a serious problem in Alberta, western Canada and the United States as well. The U.S. has lost so much soil that its potential to grow food has been cut by at least 10 to 15 per cent. Soil loss in the tropics, where food is less plentiful, occurs faster because of soil types, topography and heavier rainfall. The fertile soils of Himalaya valleys wash away in such quantities that a new island is forming in the Bay of Bengal.

The WCS identifies the loss of the enemies of pests as a serious threat to agriculture. Heavy doses of pesticides increase resistance in insects and mites, destroy their natural enemies, turn formerly harmless species into pests by killing their predators and contaminate food and feed.

Misuse of grazing land spreads trouble around the globe. Overstocking has seriously degraded grazing lands in Africa's Sahelian and Sudanian zones and parts of north Africa, the Mediterranean and the Near East, where it is a major contributor to the spread of deserts. In tropical and subtropical mountain areas such as the Himalayas and the Andes, it causes the acceleration of erosion.

The spread of deserts is a special problem. Deserts now expand almost 60,000 square kilometres a year (an area about the size of Nova Scotia). An area twice the size of Canada now teeters on the dusty brink. In dry lands which cover about one-third of the earth's land surface, advancing desert already jeopardizes the survival of almost 80 million people and as many as 630 million could be threatened by it in coming years.

GOVERNMENT OF ALBERTA

Forests

Allen says the world only has about 10 years to save lowland tropical rain forests and no more than 80 years to save the rest. When these forests disappear, not only will a huge store of genetic resources have been lost forever but regional climates and perhaps the global climate could change for the worse.

The ability of tropical forests to prevent soil erosion comes out clearly in an Argentine example. It costs that country $10 million a year to dredge silt from the estuary of the River Plate to keep Buenos Aires open to shipping. Eighty per cent of that sediment comes from only four per cent of the drainage basin, a small but heavily overgrazed catchment area of the Bermejo River.

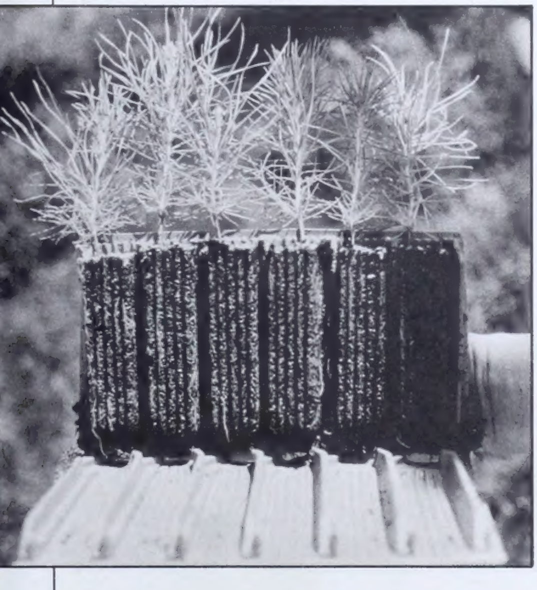
Deforestation and poor land management have caused fluctuations in stream flow in parts of southern Asia that have left high-yield varieties of rice with either too much or too little water, thereby reducing rather than raising yields. Siltation of Lake Alajuela due to erosion from cleared forest areas seems likely to substantially reduce traffic through the Panama Canal — an economic problem that has already begun.

The WCS puts the value of annual world forest production at more than $115 billion and international trade at about $40 billion. This production cannot be sustained because little effort is made to reforest.

More than 80 per cent of the developing countries' consumption of wood, excluding exports, is for fuel. Around one fishing centre in the Sahel region of Africa, where the drying of 40,000 tonnes of fish consumes 130,000 tonnes of wood every year, deforestation extends as far away as 100 kilometres. Fuel wood is so scarce in Gambia that gathering it takes 360 "woman days" per year per household.

More than 200 million people occupying about 30 million square kilometres of tropical forests live by practicing shifting cultivation — they crop an area for a few years, then clear another area, leaving the first one fallow to revert to scrub and forest. This is a stable, productive practice if the population itself is stable and the rotation does not exceed the regeneration cycle. However, in the Ivory Coast, for example, the practice reduced the forest cover by 30 per cent between 1956 and 1966 and now only 5 million hectares remain of the 15 million hectares that it is believed existed at the beginning of this century.

GOVERNMENT OF ALBERTA



The Seas

In emphasizing that the most productive marine environments are those close to shore, the WCS also stresses that these areas are the most heavily damaged by pollution, habitat destruction and overfishing. Many coastal wetlands and shallows, the support systems of two-thirds of the world's fisheries, are either degraded already or are being destroyed by dredging, dumping, pollution or shore 'improvement'. In the US, the resulting losses to fisheries cost an estimated $86 million a year.

Coastal wetlands, estuaries, mangrove swamps, salt marshes and lagoons are being removed or polluted, and are shrinking amid farms, houses, harbours, factories and garbage dumps. Of the 57 wetlands of acknowledged international importance in the Mediterranean area, only five have any sort of protection. Twenty-three per cent of the estuaries in the U.S. are severely degraded and another 50 per cent are moderately degraded. Coastal wetlands provide spawning, feeding and shelter habitat for important fisheries and, according to Allen, losses of these habitats mean "it can no longer be assumed that depleted fish stocks will recover to their full potential."

World trade in seafood in 1978 reached almost $11 billion and Canada earns more than $600 million a year from seafood exports. However, the contribution of fisheries to national incomes and diets is likely to diminish. Overfishing has already reduced the world catch to about 75 to 80 per cent of what it could be. At least 25 of the world's most valuable fisheries are seriously depleted. In the northwest Atlantic, because of overfishing in the 1960s, cod catches are still only a third of their estimated potential.

Accidental killing of seafood takes a tremendous toll. For every tonne of shrimp landed, for example, between three and 20 tonnes of fish are thrown away dead. Such poor practice has brought one species of sea turtle to the verge of extinction, prevented or slowed the recovery of several fish stocks and is damaging many populations of dolphins, porpoises, sea cows, seals and sea birds.

Aside from destroying habitat, pollution kills marine populations directly. According to the WCS, in the middle Atlantic coast of the U.S., the total cost of fish, crustacean and mollusk kills due to pollution is estimated to be $14.5 million a year. The Mediterranean, one per cent of the world ocean surface, has an estimated 50 per cent of the world's floating oil and tar, affecting fish populations, killing off populations of shellfish and seriously damaging spawning grounds of several species. In Japan, before 1970, there were fewer than 400 pollution incidents a year but since 1972 there have been more than 2,200 annually.

Saving the World

Published in 1980, the World Conservation Strategy outlined a simple way of looking at conservation and proposed a framework for other conservation strategies. The WCS suggests that there can be regional strategies such as the circumpolar conservation strategy now being prepared by northern nations, national strategies and sub-national strategies. All 12 Canadian provinces and territories are working now on their own sub-national strategies and the federal government plans to compile a national strategy when the sub-nationals are done.

Canada may be party to dozens of conservation strategies and, in fact, the International Union for the Conservation of Nature and Natural Resources (IUCN) encourages the proliferation of strategies. The IUCN, with the support of the World Wildlife Fund and the United Nations Environment Program, researched and prepared the WCS, consulting more than 450 government agencies and conservation organizations in over 100 countries as well as a list of 700 scientists in the process. The document they produced and which Canada officially subscribed to in 1981 (having participated heavily in its preparation), is remarkably short and to the point. It asserts that in today's world, conservation means three things: maintaining essential ecological processes and life-support systems such as the cycling of oxygen and carbon and the recycling of nutrients, preserving genetic diversity in order to keep our future options open, and using species and ecosystems in ways which allow them to go on renewing themselves.

Hoping to stimulate a more focused approach to living resource conservation, the authors of the strategy identified the action needed both to improve conservation efficiency and to integrate conservation and development. They said the function of every strategy, whether global, regional or local, is to determine priorities for achieving its objectives, identify obstacles to meeting them and propose the most cost-effective ways of overcoming those obstacles.

> **"For people to gain a decent livelihood from the earth without undermining its capacity to go on supporting them, they must conserve the biosphere."**
>
> — from *How to Save the World*, the World Conservation Strategy, by Robert Prescott Allen

According to Mark Halle, director of the Conservation Development Centre of the IUCN in Switzerland, they've had excellent response to the program. Between 30 and 35 countries have shown a serious interest in, begun work on or have completed national conservation strategies. Canada contributes strongly to the development of strategies for nations lacking the funds or expertise to prepare one themselves.

Halle notes that "conservation strategies are processes, not publications, and are never really complete."

The IUCN has already begun work on a task-oriented second phase of the WCS.

Despite subscribing to the agreement in 1981, Canada did little about a conservation strategy of its own until 1985 when, in the fall, the Canadian Environmental Advisory Council met its provincial and territorial affiliates in Quebec City to discuss preparing sub-national strategies.

On the provincial front, the public advisory committee to the Environment Council of Alberta resolved in 1984 to begin work on the Alberta Conservation Strategy, the prospectus for which was released in March, 1986.

To the overall objectives of a conservation strategy set out in the WCS, the ACS has added the following three:

- to provide for the recreational, spiritual, esthetic and other non-material needs of Albertans by maintaining and developing diverse opportunities for the use of natural resources,
- to maintain and improve the quality of life in the urban environment where the majority of Albertans now live and work, and
- to use and manage our non-renewable resources in the interests of developing a long-term sustainable economy for Albertans.

The Environment Council of Alberta says that the draft strategy for Alberta should be ready late this year and public hearings on the draft may follow its release.

In the face of all the doom and gloom, the World Conservation Strategy shows humans haven't lost that essential optimism that we can work our way out of an impending catastrophe, no matter how bad it looks. And, really, what choice do we have? As Halle said: "despite all its faults and problems, the conservation strategy is the only process we have that we know can work."

Eric Bailey

Endangered Species

The WCS says possibly a million species of life and many more varieties are threatened with extinction. The International Union for the Conservation of Nature and Natural Resources Red Data Book which deals only with vertebrates lists 193 types of fish, 138 amphibians and reptiles, 400 birds and 305 mammals so threatened. As many as 25,000 plant species are threatened. Habitat destruction and removal by collectors are the two main threats to plants. While the pressures of human settlement and industry may destroy whole ecosystems in particular areas, collectors tend to concentrate on rare species such as orchids and cacti and to pursue them throughout their range.

Two-thirds of threatened animal species find themselves in this predicament because of loss of habitat. Over-exploitation, the effects of introduced exotic species, competition with people for food, and accidental killing also cause their share of woe.

The Politics of Population

Our inability to manage the affairs of our own species both distracts us from the urgent needs of other species and, at the same time, makes environmental problems worse. Allen observes that the "continuing lack of conservation is likely to make life more expensive for the affluent and impossible for the poor. In so doing, it will contribute to the rise in tension between the haves and the have-nots and hence to global instability."

By 2000, the planet's resources will have to support 6.1 billion people, almost 30 per cent more than now. The global population is expected to rise by a further 30 per cent by 2025 and almost 90 per cent of the increment comes from developing regions.

"Current attempts by a quarter of the world's population to carry on consuming two-thirds of the world's resources and by half of the people simply to stay alive are destroying the very means by which all people can survive and prosper," says Allen.

For the 500 million people who are malnourished, or the 1.5 billion whose only fuel is wood, dung or crop wastes, or the 800 million with incomes of $50 or less a year, conservation is the only thing between them, and at best abject misery, and at worst death.

Could the need for a strategy to save the world be any more clear?

Eric Bailey is a freelance writer specializing in outdoor and interpretive writing, working from Alder Flats.

Sharon Adams

DEVELOPMENT WITHOUT Destruction

Sustainable development is a crucial objective

GOVERNMENT OF ALBERTA

Governments throughout the world will have to unite behind measures to promote sustainable development.

Quick, what do you think of when you think of conservation? Probably, it was some image or another of *stopping* exploitation, of blocking bulldozers, of saving a valley from flooding, or a hillside from logging.

In most of these scenarios, development is the villian, but in the real world, halting development is not a realistic approach to conservation.

The World Commission on Environment and Development, set up by the United Nations in 1983 following publication of the World Conservation Strategy in 1980, tackled this conundrum.

The Commission, with members from 21 countries and headed by Norway's Prime Minister Gro Harlem Brundtland, examined the critical environmental and development issues identified in the strategy. It decided the only way to provide for the current and future population was further development — but development that did not contribute to the deterioration of the environment, but instead leaves the environment, and development, sustainable from generation to generation.

Its report, Our Common Future, published in 1987, destroys the comfortable delusion of developed nations that they are divorced and protected from environmental devastation elsewhere in the world.

The Brundtland Commission sees the

environment and economics as intimately intertwined, and lays the blame for the global environmental siege on past economic decisions which ignored environmental consequences.

Yet it does not advocate stopping development, recognizing that more development is necessary to support the projected increase in population.

It defines sustainable development as the strategy to *safely* survive the current environmental problems and the impending population crisis.

Changing the way the world looks at economic decisions and environmental consequences calls for nothing short of a revolution in thinking at every level of human endeavor, from the international to the national, regional, and finally, personal sphere.

The Brundtland Commission wants to conscript the United Nations to develop the international battle plan, providing leadership in developing international sustainable development policies. It is pushing world governments to agree on international law and practices to achieve global sustainable development and individual countries to attack their own environmental problems, stop creating transborder problems and help other countries achieve their sustainable development strategies. Business, industry and the world banking community must begin to make decisions based on environmental integrity as well as economic imperative.

But it also wants to enlist every human being in its corps of defence shock-troops, involving ordinary citizens and everyday taxpayers in developing sustainable development policies which will link economic benefits to environmental consequences.

Alistair Crerar, the chief executive officer of the Environment Council of Alberta, believes Canadians will recognize this strategy as the old principle of living off the interest, not the capital. Sustainable development advocates taking from the environment only that which the environment can replace, and damaging the environment only to the extent to which it can recover, leaving the environmental capital intact for future generations.

He is astounded by progress both nationally and internationally, in embracing the philosophy of sustainable development.

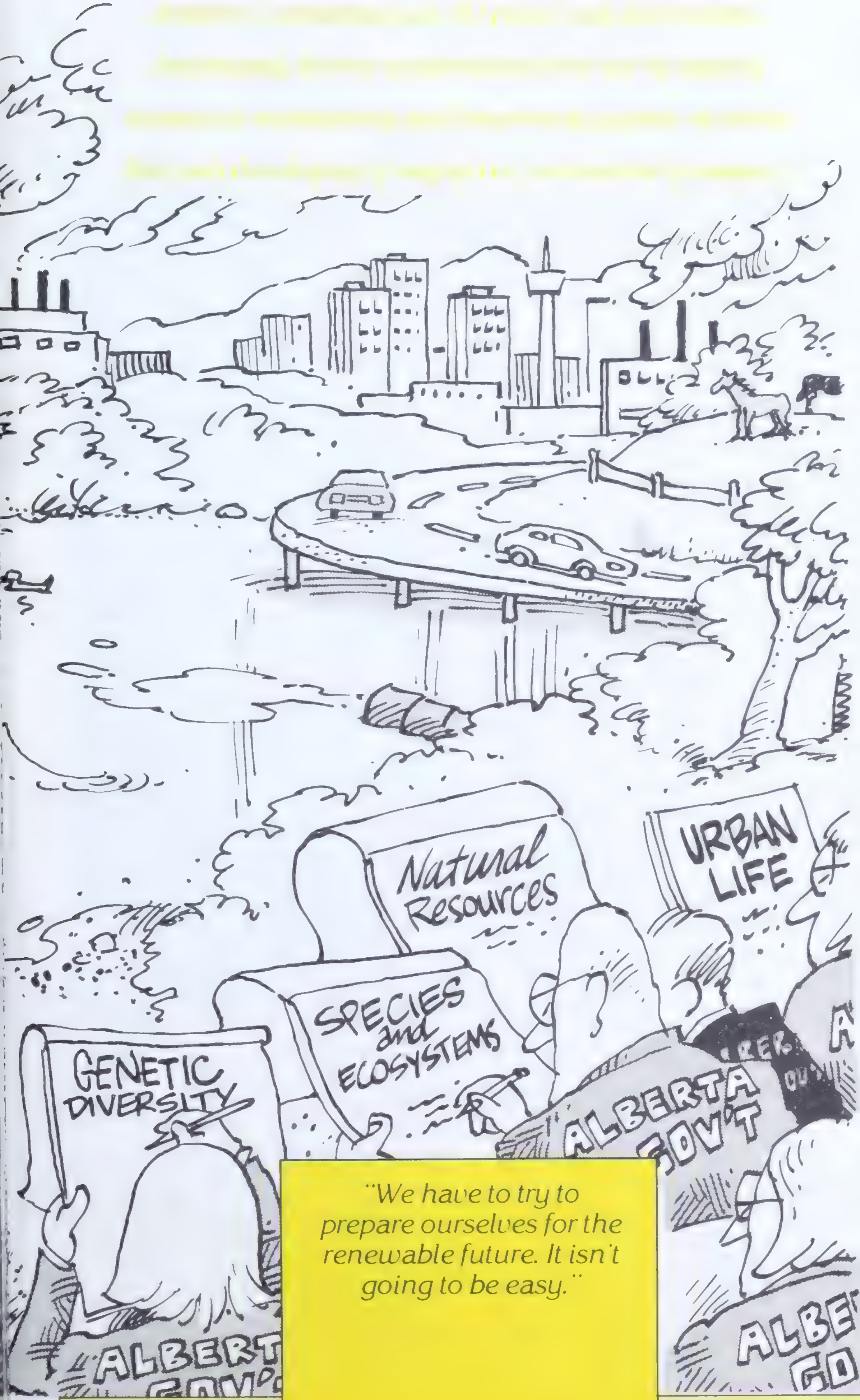
"I was amazed the Commission was able to endorse demographic planning — population reduction — despite the differences in religion and culture" which have retarded birth control efforts in many countries.

Peter Jacobs, chairman of the Environ-

FEDERAL OBJECTIVES include optimizing prime agricultural areas, protecting migratory bird habitat, developing a western water conservation strategy, preserving wild genetic stock, reducing acid rain, mitigating damage from toxic substances and planning management of the coastlines and the Canadian North.

Canadians will recognize the sustainable development strategy as living off the interest, not the capital.

"The [illegible] of the ALBERTA CONSERVATION STRATEGY [illegible]



"We have to try to prepare ourselves for the renewable future. It isn't going to be easy."

mental Planning Commission of the International Union for the Conservation of Nature and Natural Resources, says Canada's acceptance of the principle of sustainable development "was inconceivable 10 years ago."

Canada, which had two representatives on the Brundtland Commission, has made the first foray to ensure sustainable development will prevail over the 6.6 per cent of the globe it controls. It endorsed the World Conservation Strategy in 1981.

At the last First Ministers Meeting, the Prime Minister and all provincial premiers susbscribed to a plan to make cabinet ministers and their departments accountable for ensuring that sustainable development is the basis for all projects.

Every cabinet document, every project review, every proposal for funding will have to show environmental impacts as well as economic returns.

Federal objectives include optimizing prime agricultural areas, protecting migratory bird habitat, developing a western water conservation strategy, preserving wild genetic stock, reducing acid rain, mitigating damage from toxic substances and planning management of the coastlines and the Canadian North.

In 1986, at the International Conference on Conservation and Development in Ottawa, Canada reported its main problems as soil degradation, loss of prime cropland, shortages and deteriorating quality of water, and acid rain.

In September 1987 the Canadian Council of Resource and Environment Ministers endorsed a report by its National Task Force on Environment and Economy, setting out the interprovincial commitment, what must be done, who is responsible for seeing it gets done, and how it can be achieved.

It recommended provincial task forces develop their own conservation strategies to present at a national conference on sustainable development in 1989 or 1990, and that the strategies be put in place by 1992.

Crerar describes endorsement of the report as "a miracle."

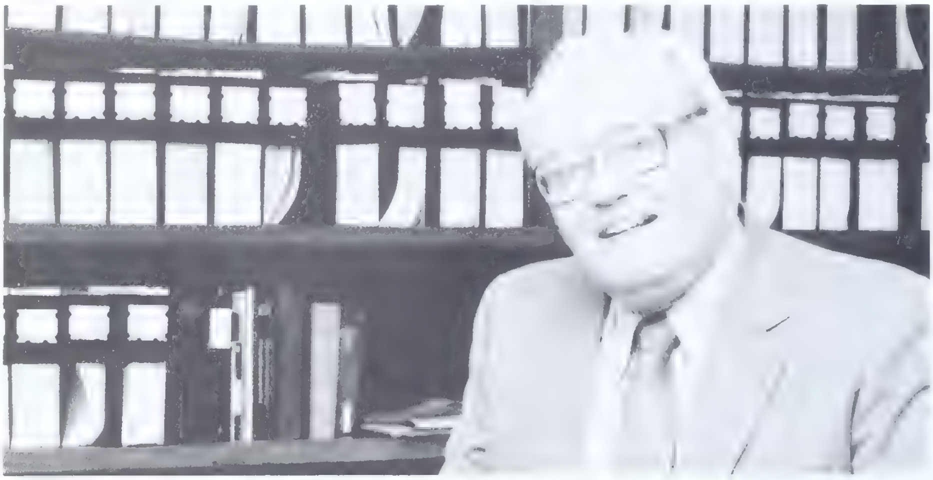
Among its recommendations are that Canadian government, so often torn by jurisdictional wrangles, integrate environmental and economic decision-making so that environmental considerations be considered in economic development proposals. It recommended that the public be involved in planning and policy-making and that ministers and their departments be accountable for promotion of environmentally sound economic development.

It suggested ensuring accountability by

requiring environmental criteria in evaluation of economic development programs and tying govenment funding and loan guarantees to these criteria.

That means, "if the forest cannot be regenerated, it should not be logged, or that if grain cannot be grown without soil degradation, there should be no government funds to do so," says Crerar in an article in Policy Options.

Jacobs, also a professor of landscape architecture at the Universite de Montreal, is "impressed that quite a number of different sectors, including the development and economic sector, have begun to recognize the fact it's not all take."



GOVERNMENT OF ALBERTA

Alistair Crerar

By the time the First Ministers made their agreement, Alberta had already begun working on the Brundtland Commission's recommendations.

In 1985, work began on a conservation strategy for Alberta by the Renewable Resources Study Group of the Public Advisory Committees to the Environment Council of Alberta.

The six objectives of the Alberta Conservation Strategy are maintaining essential ecological processes; preserving genetic diversity; sustaining use of species and ecosystems; developing diverse opportunities for use of natural resources; maintaining and improving quality of urban life; and developing a long-term, sustainable economy.

Provincial economic/environmental activity was divided into 16 major economic and environmental sectors. Background reports on the sectors, now being written, will be reviewed and the draft Conservation strategy for Alberta prepared later this year. Public hearings, possibly in the fall, will follow.

Even in his excitement, Crerar admits the hardest work begins now.

"It's not going to happen overnight. Nor can we do it in any one way — there'll be a thousand ways, a thousand things being done at any one time."

The first battle is going to be the hardest — changing attitudes. And the battlefront will be the cabinet meetings, the floor of the legislature and city council chambers, boardrooms of banks and businesses, farmers' offices, ordinary peoples' kitchen tables.

"Now we're using our capital in the non-renewable energy resources. We have to try to prepare ourselves for the renewable future. It isn't going to be easy."

One of the major problems is Albertans' attitude about land — that it's limitless and there to be used.

An example, says Crerar, is "the attitude of the Alberta caucus towards park development," referring to statements that planned development should be considered.

Farmers too see cropland as exploitable. Soil degradation, says Crerar, is one of the province's most severe environmental problems. "About 30 per cent of farms in Alberta are showing a definite improvement in soil quality, as shown by the increase in organic matter in the soil in tests. But that means at the other end of the spectrum we have 30 per cent who are allowing their soil to degrade," leaving it open to wind and water erosion. Soil acidification and salinization are also problems that need addressing, he says.

Over the next 25 years, he says, "Alberta has to address itself" to the way in which we are using our farmlands.

This will need to be part of a global restructuring of the agriculture industry. One example is the international effect of agricultural subsidies. They may work against optimum international use of cropland, leading to surpluses and waste in one area while pushing the price of food out of the range of the poor in another.

Success in areas like these, says Peter Jacobs, depends on "political will." An example of limitations on this political will, as well as a hint at its potential for success, came in Canada's attempts to grapple with global ozone depletion.

Canadians were used to the economy, convenience and cleanliness of plastic foam packaging for such products as eggs and fast-food hamburgers. Yet a production byproduct of plastic foam contributes to the depletion of the ozone layer.

In 1987, Canada signed an international agreement to curtail production of this by-product, McDonald's switched hamburger cartons, and environmentally concerned housewives stopped buying eggs in the plastic foam containers.

But Jacobs believes more could have been accomplished, a greater commitment made. "The problem still has many dimensions that are poorly understood. Now I'm concerned people will think because we've taken this one step, the problem is solved."

However, it was a step, and a promising one. "It showed a concern for the global commons," he says, "and demonstrated our ability to develop negotiating techniques" that will make grappling with other problems easier.

For Crerar, the treaty demonstrates the layering of government, industry, business and individuals' decisions necessary to the success of sustainable development.

Involvement of individuals is "absolutely essential," he says.

"The public plays a watchdog role. People concerned about recycling, erosion and pollution make those issues a part of the public agenda. They organize, they do research, they act as our early warning system and our conscience.

"They provide a critical function in democratic society."

Man took paradise and turned it into geodump. Individuals can help rebuild a livable world by embracing sustainable development.

But Jacobs believes that won't happen unless the "linkage is made between sustainable resource base and individuals' livelihoods, today, tomorrow and in the future."

Sustainable development implies changes that will cost jobs in certain sectors, and threats to jobs demonstrably weakens Canadian political will.

However, says Jacobs, "there's political and technical momentum behind this. Now we need the sweet smell of success in two or three tangible projects.

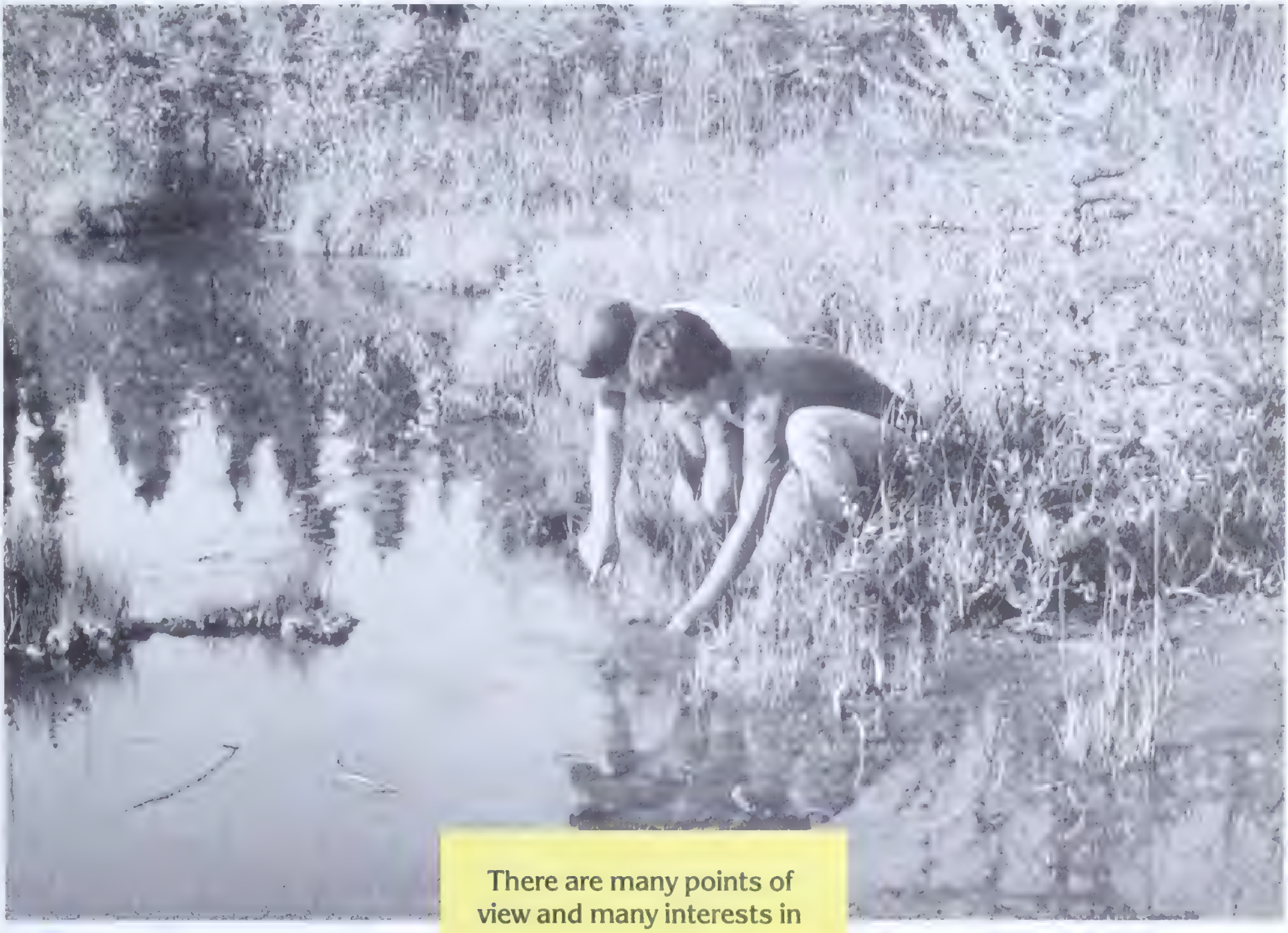
"We have to move beyond the paper-writing stage."

Sharon Adams is a Calgary freelance writer.

Gail Helgason

AN ALBERTA
Conservation Strategy

Six different perspectives



TERRY [illegible]

A University of Alberta professor, remembering how coal mines despoiled his native Wales, advocates more sensitive management of Alberta's urban and industrial landscapes, not just prime wilderness.

A Calgary biologist, whose hobby is to slip off to surrounding wetlands to observe waterfowl, identifies better wetlands management as a key priority in formulating a conservation strategy for Alberta.

And the former chairman of the Energy Resources Conservation Board (ERCB) says he has lost confidence in public hearings as a means of resolving resource development conflicts. Instead, he advocates greater use of mediation to solve the inevitable disputes.

There are many points of view and many interests in economic and environmental issues. Each of these is important. No single point of view, in isolation, can adequately reflect the complexity of the interests involved.

— Report of the National Task Force on Environment and Economy

These individuals are among the many committed individuals participating in the Alberta Conservation Strategy Project; they all hope that a broad-based action plan will result. But how can priorities be indentified when the overriding goal is so ambitious and complex? We asked the six to discuss their personal priorities — and how they evolved:

GOVERNMENT OF ALBERTA

Dr. Guy Swinnerton

Dr. Guy Swinnerton, professor and associate chairman of the Department of Recreation and Leisure Studies at the University of Alberta, is a member of the Alberta Conservation Strategy Project's steering committee. He is responsible for a major background report on parks and outdoor recreation, one of 16 sectors identified as essential preparation for a draft strategy.

Swinnerton believes that a key priority in the Alberta Conservation Strategy must be to preserve the integrity of our national and provincial parks and ecological reserve areas. He says many development-minded interests do not understand "the philosophy of integrity" — the idea that some designed areas of land should be set aside to remain virtually free from human interference.

Swinnerton, who has a background in land-use studies, admits that national parks could be further developed in ways which consider both esthetics and protection of the surrounding eco-systems. But by advocating even this kind of development, "we are basically undermining the integrity of these areas. We've had more than ample evidence that there is an increasing need for vigilance."

A second priority, he says, is to fully recognize the role of the private sector in achieving an Alberta Conservation Strategy.

Swinnerton was brought up on a farm in Wales, within a kilometre of what was to become Brecon Beacon's National Park. Although coal mining blighted this landscape, he still gained a love of nature through frequent nature trips to nearby forests and countryside.

"One could see the need to develop land-use harmony. We had a project, even in elementary school, where we went down and planted trees with the forestry commission."

He says that in Britain, by necessity, there has long been a need to balance resource demands with environmental protection. On an island one-quarter the size of Alberta — but with twice the population of Canada — this has resulted in a strong tradition of land husbandry among landowners. It has also meant that relatively common landscapes are valued, not just scenic areas.

"I don't think that most Albertans fully appreciate how landscapes evolve, and how land that appears ordinary has an important place in the overall environment."

Swinnerton hopes that an Alberta Conservation Strategy will find ways to protect both spectacular landscapes and more ordinary areas, such as some wetlands, native grasslands and farmland. For that to happen, environmental protection must receive greater consideration at the planning stage — preferably through an agency with overall responsibility for heritage and resource protection.

Biologist **Joan Snyder** of Grande Prairie, chairman of the Alberta Conservation Strategy Steering Committee, credits folk-singer Joan Baez with sparking her now-consuming interest in conservation strategy.

Snyder, a professor at Grande Prairie Regional College, was attending an environment conference in Banff in the early '80s when Baez appeared to make an eloquent call for a World Conservation Strategy.

"I really got excited about it," says Snyder. She soon translated her interest into involvement with the Environment Council of Alberta. She is now responsible for seeing that the concerns of nearly 124 organizations are drawn upon in the committee's preparation of a draft strategy.

Snyder firmly believes that reasonable solutions to environmental concerns can usually be worked out amicably — as long as enough people are involved in decision-making: "The vast majority of people do have concerns. But it's going to take a lot of people being involved."

She cites as an example winter grazing habitat for caribou in northwestern Alberta, a subject she has researched extensively. For about two months every year, caribou rely on the nutrients and shelter found in old-growth forests — which are under increasing pressure from loggers.

Unless present logging practices are changed to recognize the importance of these old-growth areas, there may not be any such habitat left for caribou in coming decades.

The situation presents a conflict — but not an impossible one, according to Snyder. Logging companies could be persuaded to use longer rotations, or to set aside reserve areas: "Basically, these kinds of arrangements can work if they are made priority items in our culture."

Although Snyder was born in Chicago, her concern for the environment began early when she followed her engineer father on his outdoor excursions. As a child moving from place to place in the United States, she began to see that the natural areas she cared about were gradually being eroded by development.

Snyder earned a PhD in plant ecology and moved to Canada, taking a teaching position in Grande Prairie in 1980: "I thought maybe in Canada, we still had a chance."

She still thinks that chance exists — with the help of a well-formulated conservation strategy.

Vern Millard of Calgary has a unique perspective on how conflicts can be resolved by negotiation. As chairman of the ERCB for eight years, he witnessed both the volatile nature of resource development disputes — and the satisfaction of successful mediation.

GOVERNMENT OF ALBERTA

Vern Millard

Now retired, Millard is writing a background report on sustainable use of oil and gas for the Alberta Conservation Strategy Steering Committee.

An economist by training, he believes that market forces usually work toward the best solutions for everyone — even in matters of conservation. Yet economic forces alone must not be allowed to dictate conservation policy: "The other side of the coin is that the (free market) system is sometimes rather brutal in terms of individual cases."

Millard still thinks that public hearings have educational value because they allow the affected parties to hear each other's point of view. But he is dismayed by their increasing formality.

"They are fundamentally adversarial processes. Lawyers are often brought in, making them even more adversarial and widening the gap between the two parties."

Now Millard believes that regulatory bodies such as the ERCB can play a more meaningful role as "a kind of mediator, a negotiator, trying to find answers that both sides can find acceptable."

He uses as an example a conflict which arose in 1984 when Syncrude Canada Ltd. applied to expand its plant in northeastern Alberta. The native settlement of Fort MacKay objected, even though studies showed that the expansion would actually decrease sulphur emissions, and the productivity increase would give a substantial benefit to the province as a whole.

In further meetings, the ERCB learned that the residents' concerns were really related to lifestyle — water safety, sewage and other local issues — not the plant expansion itself. A committee was formed to deal with these issues; members included senior Syncrude management and the community. The ERCB funded the cost of band participation.

"It was an outstanding success," says Millard. "And if we had just followed the normal routine, it would have resulted in an adversarial situation."

Ask **Robyn Usher** what she sees as priorities in establishing an Alberta Conservation Strategy, and she's apt to reply with one word — "numbers".

"For a long time we've spoken in qualitative terms," says the wildlife biologist with Integrated Environments Ltd., a Calgary environmental consulting firm. "Now we need to get down to dollars and cents."

Usher is preparing a background report on the province's wetlands for the Alberta Conservation Strategy Steering Committee. She believes that the preservation of wetlands is critical, and that this goal can best be achieved by economic arguments.

GOVERNMENT OF ALBERTA

Robyn Usher

Economic evaluations of the worth of wetlands are not only possible, but are already well-developed in some jurisdictions. Such evaluations make possible tax incentives and other means of encouragement for farmers.

Born in Montreal, Usher came to Alberta 12 years ago and has devoted much of her professional career to restroing wetlands through such organizations as Ducks Unlimited.

"I have an abiding love of waterfowl," Usher says. "My enjoyment when I first came to Calgary was to drive outside the city and just observe birds."

She says economic incentives are critical because the wetlands most in need of protection are small and temporary. They seem to have little value. In fact, these small bodies of water are tremendously rich in aquatic invertebrates — "little protein warehouses" — which supply nesting females with essential nutrients.

These tiny wetlands also affect the local climate. They attract more moisture to the area, increasing crop production and benefiting the eco-system in many other ways: "Only in the last 10 years has the importance of these wetlands been recognized," syas Usher.

Resource management, in other words, must involve consideration of entire ecosystems, not just one part of them. This, says Usher, must be another prime goal in formulating an effective Alberta Conservation Strategy.

Elmer Kure, a retired Innisfail farmer, believes an Alberta Conservation Strategy must find ways to halt agricultural use of marginal land, before dustbowls similar to those of the 1930s reappear.

"Farmers are always in an economic crunch," says Kure, who is responsible for drafting a major report on renewable resources for the strategy's Steering Committee. "You can always justify taking that last acre."

Born on a farm in Illinois, Kure came to Alberta as a child and started farming on three-quarters of a section in 1943. He later joined the Alberta Fish and Game Association, where he became deeply involved with conservation issues. Kure spent over 15 years publicizing conservation for the association, and is credited with first bringing the need for conservation strategy to the attention of Albertans.

He sees agricultural overproduction and and reliance on chemical fertilizers as major barriers to sustainable use of agricultural lands. Even good farmers, who follow such practices as growing nitrogen-fixing alfalfa and other legumes in rotation with other crops, are experiencing rapid deterioration of soil nutrients because of these factors.

"Just stop fertilizing next spring and compare your yield," he challenges. "You'll probably discover your production is down by one-third to one-quarter."

Kure, a second-generation farmer, remembers clearing his own land and relying on a neighbor to maintain natural habitat. One day, Kure's neighbor was gone — and the new farmer quickly cleared the natural areas.

"We relied on someone else to do it for us," says Kure. "That was a mistake. Every farmer will have to look at conserving his piece of land."

While advocating individual responsibility, Kure says incentives are necessary to promote land husbandry. He also criticizes large farm organizations which "do not seem to want to take a leadership role in conservation".

Although retired, Kure continues to live on his farm and has the satisfaction of seeing his son Colin use sound agricultural practices.

"We need to act as if we are interested in staying here," he says. "The farm is a place where you can do that."

To **Mike Kelly,** co-ordinator of the Alberta Conservation Strategy, the real importance of a strategy is that it sets up ways of solving problems.

"A conservation strategy is absolutely not some bible that you go to for answers," says the senior research officer with the Environment Council of Alberta. "It's the mechanism by which you effect change."

The intent is to prepare for as many eventualities as possible, he writes in the journal *Conservation Strategies in Canada:* "First you build your support around the goals, then design action to reach the goals, then act. One step at a time."

Mike Kelly

Kelly, whose background is in resource economics, notes that government bureaucracies may be unwilling to develop truly integrated plans for sustainable development because of their departmental organization. Although improvements have recently been made, "our departmental system of government ensures that we will have single-sector decision-making."

It is therefore vital that mechanisms be developed to improve inter-agency co-operation and ensure that policy planning takes into consideration "the interconnectedness of our various resources and the benefits of managing them with that in mind."

In 70 to 80 per cent of the disputes over resource protection, all parties support the same goals, says Kelly: "Ultimately, there is still going to be conflict. That is where the political process comes in. But we waste a lot of time because we think we are in some dramatically opposing situations."

Kelly became involved in resource issues while working for the Institute of Northern Studies in Saskatchewan.

Co-ordinating the Alberta Conservation Strategy has been a major part of his job since 1985 — one which fits in well with his long-time love of nature: "The outdoors has been my avocation. I've been a sports fisherman since I was a little kid."

Conservation strategies, he has written, are not for cynics, Utopians or dreamers.

"They are for people who try to see problems clearly, who are willing to make decisions about this being more important than that, who will persevere in resolving problems through difficult times, who will methodically set feasible goals and then reach them."

Gail Helgason, a partner in Helgason & Dodd Communication Services Ltd., is an Edmonton freelance writer and editor, and co-author of several outdoor guidebooks to Alberta.

Good News

Albertans have been trying to conserve important areas of their natural environment since before there was an Alberta. The Alberta Natural History Society, founded in 1906, started lobbying the provincial government for habitat conservation as soon as the legislature was formed. In 1924, the association's persistence won the establishment of Alberta's first Dominion bird sanctuary, the Gaetz Lakes in Red Deer.

Small groups of local residents also brought about the creation of two national parks in Alberta: Waterton Lakes in 1895 and Elk Island in 1913. While the National Parks system put greatest emphasis on tourism when it established the first national park in Banff in 1885, it had enshrined the conservation ethic in the National Parks Act by 1930. Now five national parks cover more than 50,000 square kilometres of the province.

Alberta set aside Aspen Beach on Gull Lake as its first provincial park in 1932. It was the first in a system of summer fun parks, and these recreational hot spots still draw the greatest visitation among the 61 parks which now comprise 125,000 hectares. But public support for conservation has changed the goals of the provincial park system as well, leading to the establishment of such large wilderness parks as Siffleur, White Goat and Willmore. Alberta Recreation and Parks, in their 1988 policy statement, acknowledged the principles of the World Conservation Strategy.

Albertans haven't relied only on the government to conserve habitat. Ducks Unlimited celebrates its 50th anniversary in Canada and Alberta this year. Nearly 9,000 Albertans now belong to DU, which has constructed about 1,500 provincial wetland complexes to conserve waterfowl.

Many reserves set aside as shooting grounds in 1950s helped form the nucleus of Alberta's Natural Areas Program, officially begun in 1971. More recently, though, such areas as Wagner Bog near Edmonton have been included in the program because of persistent lobbying by local residents. There are now 112 designated Natural Areas and another 145 sites identified for possible inclusion. In all, 103,509 hectares of ecosystems are getting varying degrees of preservation and use. Some of the existing Natural Areas have been given stronger protection under Ecological Reserves legislation enacted in 1981. To date, 10 have been established and another four await inclusion in the system.

Wagner Bog, one of Alberta's newest Natural Areas (also page 13)

TERRY THORMIN

The list of conservation initiatives in Alberta is long and includes many successes which show the willingness of Albertans to get personally involved. The all-volunteer approach of the Alberta Conservation Strategy hinges on that willingness, which is in fact largely responsible for the great variety of environments left to conserve.

— *Eric Bailey*

Kristin Goff

EXOTIC PEDIGREES, Endangered Parents

Genetic diversity is a casualty of environmental degradation

Next time you sip an Alberta brew or crunch on a piece of toast, consider for a moment the international debt we owe for the homegrown ingredients in these foods.

A mere 175 years ago, when the West's first agricultural settlements were in their infancy, farmers could do little better growing wheat and barley than they could pineapples and bananas.

"Cereals are not native to Canada at all," says Dr. Barrie Campbell, a wheat breeder and research scientist at Agriculture Canada's Research Station in Winnipeg. "So really everything was introduced."

Varieties brough in fared badly for most of the 19th century.

The Canadian winters were too harsh for most winter wheats, the western growing season too short for spring varieties used in Europe. Yet today, wheat, barley and another "immigrant" crop — canola — have flourished, and are now Western Canada's three leading cereal crops.

As in many other places around the world, careful, persistent and sometimes just lucky attempts at breeding created crop varieties uniquely equipped to thrive in Western Canada.

The obvious benefits to food production form one of the main utilitarian arguments for the need to preserve global genetic diversity. It's a major reason why the World Conservation Strategy and Alberta's Conservation Strategy prospectus list genetic diversity as a top priority in their plans.

One need look no further than the nearest farmer's field to see some striking ways in which the global resources have already changed our world.

One of the early breakthroughs came with the development in 1911 of Marquis wheat, a Canadian wheat bred from ancestors who hailed from India on one side and the Ukraine on the other.

Marquis matured much earlier than other wheats, and thus endeared itself to farmers who had often watched helplessly as their crops froze in the fields before they were ready to harvest. It had other fine qualities too, including good yield and excellent milling and baking qualities. Those helped make Marquis the statutory standard for its type of wheat until just last year when a newer variety finally took its place.

As anyone who has talked to a farmer knows, Marquis didn't end western wheat farmers' problems. But it provided enough security and high yields to spur the precarious business to a far more secure footing.

For barley, a species with the unglamorous name "O.A.C. 21" (after Ontario Agricultural College where it was developed) provided a similar breakthrough for that cereal crop in the early 1900s.

Its genetic roots, too, were far from the western plains of Canada. The material used to cross-breed came from a bulk seed selection brought from an area in northeastern China, according to Dr. Bryan Harvey, head of the crop science department at the University of Saskatoon.

Newer varieties can claim parentage that's quite complex, if not downright cosmopolitan.

As traced by Dr. Harvey, the contributors to one popular barley, Conquest, includes the following ancestors: Olli from Finland (which contributed early genetic material); Trebi from the south shore of the Black Sea in Turkey (brought strong straw and smut resistance); Peatland from a bulk selection in Switzerland (brought stem rust resistance); O.A.C. 21 from a bulk selection out of northeastern China (contributed quality); and Lion, from a bulk selection from southern Russia (contributed smooth awns rather than barbs).

That gene recipe doesn't even get into the Canadian ingredients which, by Harvey's reckoning include about eight domestic species which played a role in parenting Conquest.

An effort to track the history of breeding, says Dr. Harvey, "is sort of like tracing your own ancestors. The further you go back, the more ancestors you've got."

Ultimately, of course, all crops trace back to their centres of origin. But in many of these centres and in less developed areas where wild relatives and primitive varieties have long survived, rapid changes are threatening crucial sources of genetic diversity.

Under a process referred to as "genetic erosion" many wild or primitive varieties of crops simply disappear as modern types of crops are grown in their place or farmland is developed for other uses.

Along with the loss of species and varieties of plants comes the loss of valuable breeding grounds where wild or primitive cultivated crops could naturally evolve into diverse and useful varieties.

The loss to the global gene pool is very great since these primitive varieties have often served as the source of sought-after characteristics bred into modern cultivated species.

Dr. Brad Fraleigh, acting head of Agriculture Canada's Plant Gene Resources, says that's largely because traditional agriculture has been geared to diversity as a safeguard against the loss of entire crops. Modern crops are bred for high yield and uniformity.

Subsistence farming seeks the security which comes from having varieties with different maturation times, different resistances to disease or different abilities to withstand insect attacks.

In the fight to preserve diversity, seed banks or "gene banks" as they are more properly called has become the first line of defence for agricultural biologists.

Gene banking has some shortcomings and isn't practical for some types of plants but it does have the advantage of being both compact and convenient.

At the Plant Gene Resources Canada bank, for instance, some 82,000 samples are stored and there are plans to increase that to about 150,000 by 1990.

Seeds which are in long term conservation banks can be preserved for remarkably long times. Scientists think that barley, stored at -20 C with all but six or eight per cent of its water content removed, will be good for 3,000 years. Less drastic measures and storage at plus 4 C can ensure barley germination for more than 30 years, said Dr. Fraleigh.

AGRICULTURE CANADA

Seed stored below freezing, as at this Ottawa gene bank, may be good for 3,000 years.

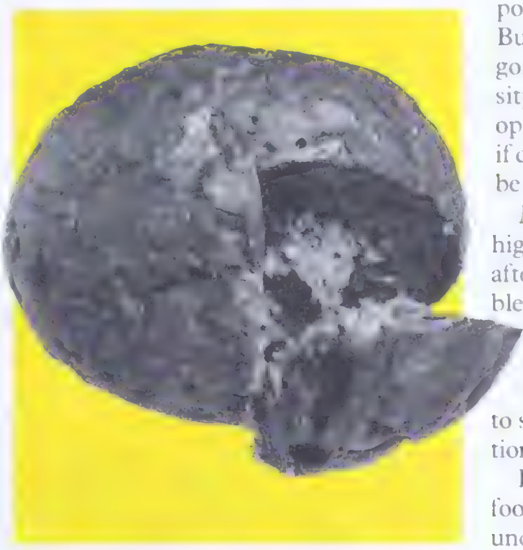
> *An effort to track the history of breeding, says Dr. Harvey, "is sort of like tracing your own ancestors. The further you go back, the more ancestors you've got."*

Nearly half of the 82,000 samples kept by the Ottawa gene bank are in an oats and barley collection undertaken by Canada under a world banking co-operative designed to conserve genetic diversity in major crop species.

Collections for these banks began in earnest following World War II when scientists first became alarmed about genetic erosion.

But it wasn't until the early 1970s that the International Board for Plant Genetic Resources began a global co-operative system of gene banking of major food crops. About 40 to 50 members are involved in its conservation efforts now.

For each of the major base collections, like Canada's oats and barley bank, two



"twins" are set up with duplicate material in other countries as insurance against the loss of any one collection. Canada has two such twin banks, one for millet and the other for brassicas which include canola.

Plant Gene Resources also has collections of major food crops in Canada which are geared to more active use by breeders and include some of the genetic materials which come from advanced stages of experiments. The national seed collection includes varieties of wheat, rye, peas, sunflower, corn, flax, and buckwheat.

Like all scientists involved in attempts to protect or preserve genetic material, Fraleigh must struggle with the unanswerable question of "how much is enough?"

On the one hand "we can't just go on storing more and more material ... (at some point) we have to put a lid on it," he said. But on the other hand, one of the main golas of the preservation of genetic diversity is to leave open for future generations options which otherwise would disappear if diversity of species and varieties were to be lost.

Major food crops have received the highest priority in collection efforts since after World War II. That's understandable since only eight food crops, led by wheat, rice, maize and potatoes, provide about three-quarters of the plant nutrition in the human diet, according to studies cited by the Alberta Conservation Strategy Prospectus.

But with an estimated 80,000 edible food plants known to exist, much remains undone in preserving food crop diversity.

Conserving Diversity

The role genetics has played in the development of food crops is only one small part of the broad-based arguments favoring preservation of genetic diversity.

After all, it's been estimated that only 30 food crops supply all but five per cent of plant food sources for human diets. Yet the world holds an estimated five to 10 million species, including invertebrates and lower plants as well as some 500,000 higher plants and 45,000 vertebrates.

No one is quite sure how many species and varieties are disappearing as natural habitats are lost through encroachment by civilization. Some guesses suggest that up to a million species will have disappeared in the 20-year period up to the end of the century.

The most threatened areas include ecologically sensitive fresh waters, wetlands and tropical forests, all far from the Canadian plains. Yet the loss of organisms from those areas will have a direct impact on Canadians and others in developed countries.

The rich variety of plant and animal life found in such areas have formed the basis for much of today's pharmaceutical industry. Nearly half of all prescription drugs are derived from wild species of plants, animals and microbes, according to one 1984 study cited in the Alberta Conservation Strategy Prospectus.

Those include quinine for malaria, digitalis for heart problems and even aspirin, a synthetic drug modeled on a naturally occurring compound from willows.

One frustration for researchers is that so little is known about the rich and varied vegetation in the tropics and elsewhere.

"In many cases we don't know what the loss is or would be (if a plant becomes extinct.) There are many plants out there that we've done no work on. No one's looked into whether these plants are possible food plants, whether these plants are possible medicinal plants or a source of food for wildlife," said Ann Smreciu of the Canadian Plant Conservation Program.

Smreciu's more immediate concerns lie closer to home. She heads the native plant subcommittee of the Canadian Plant Conservation Program which is concerned with threatened and endangered plants across Canada. Its goals are to share information on what work is being done on threatened plants and to set up a program to preserve the most seriously endangered ones at botanical gardens or other institutions.

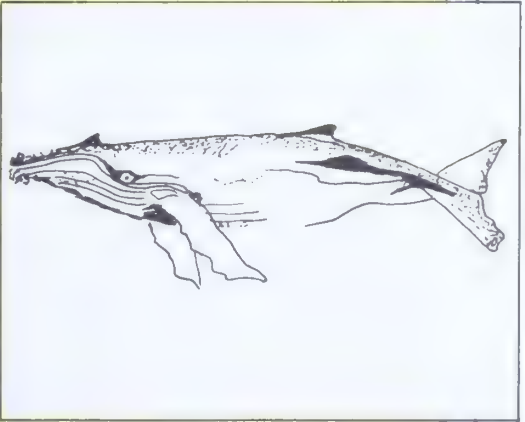
The Wild West Project, funded by the World Wildlife Fund, is trying a different approach in its efforts to preserve endangered species. Its goal is to set aside a series of preserves that would conserve whole ecosystems in each of the major prairie grassland types.

The development of the West and the plowing of vast expanses for farming wiped out three-quarters of the natural prairies across the western provinces. In some areas where the tall prairie grass once thrived, 95 per cent of the land has been plowed, says Geoff Holroyd, a project member and head of the Canadian Wildlife Service's Threatened Wildlife Section.

The Wild West Project will complete its studies in another year and members hope that policy makers at both federal and provincial levels will take action. At stake, says Holroyd, are more than 30 endangered and threatened species of plants and animals in the Canadian West.

"It may not be many when compared to a tropical rain forest. But if we in Alberta with all our wealth can not preserve all of our species, how can we expect people in developing countries to maintain reserves and maintain genetic diversity?"

— Kristin Goff



Sperm whale.

GOVERNMENT OF ALBERTA

Many of these plants have not been studied, let alone evaluated to see which may be most threatened with extinction.

Even when collections are extensive as they are for wheat and other cereal crops, gene banks are not the whole solution. The very act of taking the plant out of its natural environment halts the evolutionary process which created it in the first place. Once stored in a seed bank, it is literally frozen in time.

One of the easiest ways to lose genes is to plant the seeds out too often, says Dr. Fraleigh. The self selection process that might occur in the artificial environment of a research station could result in a genetic shift that is far from what would have evolved in a natural ecosystem.

The concern over the need to preserve genetic diversity comes at a time when, in the field of major crops at least, there is an explosion in the amount of genetic breeding going on.

For instance, Agricultural Canada last year licenced 160 varieties of all kinds of crops for use in Canada. The development of just those new varieties required several tens of millions of plants to be grown.

Production of new varieties usually means older ones will be replaced in a constant evolution aimed at keeping up with changes in markets and threats of disease and pests from nature.

Rarely does it mean a widening of the varieties of crops grown for modern agriculture, which values uniformity in markets and in farm methods, and rests on a very narrow genetic base. In wheat farming, for instance, authors of the 1980 World Conservation Strategy estimated that only four varieties produced 75 per cent of the wheat crop grown on the Canadian Prairies and one single variety produced more than half.

Still some scientists believe that genetics is about to break through to a whole new technology which could vastly speed and change the way breeding is done.

Developments in biotechnology suggest that some day it might be possible to isolate the wanted characteristics in one organism and transfer only the pinpointed genetic material to the host.

If so, says Dr. Fraleigh, the genetic material being preserved today will become even more important either for direct genetic transfer or as models to be reproduced synthetically.

"Genetic resources are at the base of all agricultural progress. If you don't have the genes, you won't be able to adapt to changing agricultural objectives."

Kristin Goff is a freelance writer living in Edmonton.

John Dodd

WHAT YOU Can Do

The individual can make a difference

A simple form of conservation is to buy only what you need.

GOVERNMENT OF ALBERTA

From where you are sitting right now, point north. Now can you describe the soil around your home and name five native edible plants in your area? Where does your garbage go? How many people live next door to you and what are their names? Were the stars out last night?

These questions, part of a quiz which appeared in CoEvolution (Winter, 1981), are described as a basic test of environmental perception of place — the beginning of an individual sense of conservation and perhaps the roots of any conservation strategy. Without such a sense, conservation for most people and their governments is "an obscure peripheral activity perpetrated by birdwatchers," according to environmentalist Robert Prescott-Allen in *How to Save the World* (Prentice-Hall, 1980). That book is a popularization of Allen's comprehensive World Conservation Strategy.

Bill Shaw of the Red Deer Regional Planning Commission, who has been pressing for a conservation strategy for almost 15 years, believes that solutions must ultimately come from among neighbors rather than just through massive government action.

Conservation begins with the individual and is best promoted in the beginning through community programs, he says. He likes to see local pilot projects — such as Edmonton's garbage recycling program — used as educational tools.

Under the program, 2,106 houses in three representative areas of the city have been asked to separate all the newspaper and glass out of their garbage. These are placed in special blue boxes and picked up separately from regular garbage. The program's participation rate — about 70 per cent — is considered good.

"It's an outstanding program," says Mike Kelly, senior research officer for the Environmental Council of Alberta, whose own home lies within the recycling zone. "Once you start doing it, there's no trouble. What's amazing is that we don't do it everywhere in the province."

Joan Snyder, head of the Alberta Conservation Strategy Steering Committee, describes the strategy as "education." She says more people than ever before are aware of the work to draft a strategy because of better communication through the media. But superficial awareness needs to broaden into solid education. For example, she is concerned that some teachers aren't well enough informed about conservation to pass information along to students. She'd like teachers to attend workshops on conservation.

The report of the National Task Force on Environment and Economy, submitted to the Canadian Council of Resource and Environment Ministers last September, identified a need for education at all levels of society: "The importance of educating our children to the new economic and environmental realities cannot be overstated. We believe our children should have a better understanding of the environment so they can treat it with respect when they become decision-makers in their own right."

Children have a great natural curiosity about the world around them and adults are too often vicarious travellers and adventurers, says the Prospectus for an Alberta Conservation Strategy.

The other way for children to learn about conservation is through their parents' example, says Shaw. If children see their parents taking time to recycle garbage, limiting use of herbicides and pesticides, picking up litter, avoiding noise pollution and generally trying to follow a lifestyle that isn't destructive to the environment, they are likely to do the same themselves when they grow older.

In *Voluntary Simplicity* (Prentice Hall 1980), author Duane Elgin suggests that both adults and children can help develop ecological consciousness by trying to distinguish between "wants" — encouraged by mass-media advertising and pressures to consume more to keep the economy growing — and real, vital "needs."

He suggests four basic questions that could be posed to encourage balanced consumption:

1. Does my consumption promote self-reliance and involvement or does it induce passivity and dependence?
2. Are my consumption patterns basically satisfying or do they serve no real need?
3. How tied is my present job and lifestyle to installment payments, maintenance and repair costs and the expectations of others?
4. Do I consider the impact of my consumption patterns on other people and on the earth?

Shaw suggests that people examine the objects in their homes and consider what portions of the land have been tied up to produce these items.

Coffee, for example, is usually grown in poor countries on land that could have been used to produce food for the local people. The use of teak in furniture may be contributing to the rapid destruction of the tropical rainforest.

Once you start changing the way you look at the world around you, all the rest falls into place, says Kelly.

He believes Albertans are basically in support of almost any environmental improvement. He finds that Albertans are consistently five points ahead of Canadians as a whole in their support of environmental issues, perhaps because the outdoors is so close to them. Yet while the support is there, he hasn't seen enough action by the individual at home or on the farm.

"Until we feel the pinch, there won't be tremendous action. Right now, it can be hard to see the consequences of our actions."

Such participatory programs as garbage recycling may go far to counter what *How To Save the World* sees as one of the main obstacles to conservation: "The belief that the conservation of living resources is a specialized activity rather than a process that cuts across . . . all sectors of activity."

A conservation strategy must be brought down from abstract principles to a point where people in the street can feel its meaning, says Dr. Guy Swinnerton of the University of Alberta. He is preparing the background paper on parks and outdoor recreation for the steering committee.

But Swinnerton cautions that the individual may have a hard time feeling really involved.

Conservation often seems a matter only for governments, big corporations and large interest groups. Even public meetings can be seen as dominated by these groups, especially by their lawyers. Can the small voice be heard?

Kelly believes it can: "The preparation of conservation strategies has become a major public consultation process and in most cases, the process has been a grass-roots, unifying and democratizing process," he writes in *Conservation Strategies in Canada*, published by the Canadian Society of Environmental Biologists. "Public involvement in decisions on important matters is always messy, confusing, slow and essential. It is essential only if you want to succeed over the long term."

"Ignoring the public or colonializing them by making decisions about their future without consultation makes decision-making easier. But any successful politician knows that such decisions are often resisted, sabotaged or just plain rejected even if the general direction of the decision is agreeable to most people."

And the individual need not speak alone. Swinnerton points out that there's a group for virtually every area of interest connected with conservation — from fish and game associations to groups concerned with architectural heritage. One hundred and twenty-four of these organizations are represented on the public advisory committees for an Alberta Conservation Strategy.

If you belong to one of them, you can contact the group's representative to see which sector of the strategy he or she might be working on and how you might contribute.

If you want to work on a different sector — anything from agriculture to urban environment — you could phone or write to the Environment Council of Alberta (8th Floor Weber Centre, 5555 Calgary Trail Southbound, Edmonton, T6H 5P9 (403) 427-5792) to indicate your choice. Your name will be passed along to the steering committee member responsible for that sector.

If you belong to an organization not represented on the Public Advisory Committee, membership might be considered if it is a broad-based group with an interest in environmental matters. Contact Archie Landals, Director of Liaison at the Environment Council.

And even if you don't belong to a participating organization, you can volunteer your time and effort to whatever sector concerns you the most. Contact Mike Kelly or Kim Sanderson at the Environment Council.

"Ultimately," says *How To Save the World*, "no conservation strategy or program can succeed unless everyone behaves as a conservationist."

John Dodd, a partner in Helgason & Dodd Communication Services Ltd., is an Edmonton freelance writer and editor, and co-author of several outdoor guidebooks to Alberta.

BOOK REVIEW *by David Spalding*

Our Common Future. The World Commission on Environment Development.

Gro Brundtland and others. Oxford University Press. 1987. 400p. $13.50.

The Life of a River

Andy Russell. McClelland and Stewart. 1987. 179p. $22.95.

If all the world's problems are not environmental ones, at least they all have an environmental aspect. In the last two decades leaders of world opinion have been moving from a recognition of the extent and seriousness of environmental problems (*Silent Spring* was published less than 20 years ago), to a feeling of the interconnectedness of all the issues, and the beginning of an attempt to find proactive and wide-ranging solutions to our problems.

These books — both important to Albertans —look at environmental problems on different scales, and in different ways. One is world-wide in scope, attempting to discuss environmental problems objectively within the complex of seemingly insurmountable problems facing the world, but is not easy reading. The other discusses a limited region of Alberta, ignores much of the wider context, is passionately subjective, and provides an entertaining read.

Our Common Future is the report of the Brundtland Commission, established by the United Nations in 1983 to create "a global agenda for change." The Commission was chaired by Gro Brundtland, who had become Prime Minister of Norway after several years as environment minister. To secure wide input, hearings were held around the world (including six in Canada in 1986), at which more than 500 written submissions were received.

The Commission's members were from 21 countries across the world, representing scientific and political views from nations large and small, developed and developing. Canada was well represented, with both Maurice Strong on the commission and Jim MacNeil as Secretary-General. A particular strength of the commission was a membership representing a great variety of shades of opinion. As a result, the report is sensitive to the different needs and perceptions of third and developed worlds, east and west of the iron and bamboo curtains, and to many of the special concerns of aboriginal peoples and women.

The report has now been made available in a substantial volume. The list of contents begins with an "Acronym list and note on terminology," and this is unfortunately all too indicative of the style of writing. Virtually the whole document is written in the bureaucratspeak that will be recognized on sight by any civil servant, but will do nothing to encourage the average reader. A few colorful phrases help focus our minds — the term "environmental refugee" adds new color to the faces of the starving on the TV news, and "ecological capital" will perhaps help explain the significance of whooping cranes and vanishing wetlands to economists. A sprinkling of boxes present direct quotes from submissions at the hearings, and some of these have a directness that reminds us of what is missing from the rest of the text. A Canadian Indian points out that his people are "the first to know about changes in the environment, but the last to be consulted"; an Indonesian talks of the "mistake in the West in developing technology without ethics, without religion."

If the manner is generally less than exciting, the content is fascinating. In Part I *(Common Concerns)* three chapters set the scene, and identify a clear direction for the future of the world, towards a sustainable development in which the world's population and its activities are in balance with the resources available. Part II *(Common Challenges)* discusses the problem areas of population, food security, species and ecosystems, energy, industry, and the urban challenge. In the final section *(Common Endeavours)* the problems of managing the world's common resources (the oceans, the Antarctic, and space) are discussed, as well as the complex relationship among peace, security, development and environment, and the text finishes with proposals for institutional and legal change. Appendices present a summary of proposed legal principles for environmental protection, and discuss the commission and its work.

The statistics and terse summaries present a world that may not be familiar to all of us. We learn, for instance, that the world's growth in cereal production is actually outstripping population growth — but we cannot get food to the people who need it; that there has been a sevenfold increase in goods manufactured since 1950; and that anti-pollution technology has already been proven cost effective. Problems are not generally approached head on — the population chapter does not discuss the position of the Catholic Church; the industrial chapter does not refer to the U.S. position on acid rain.

If the report avoids confrontation, the quietly presented solutions are drastic. Among them, we are told firmly that traditional national sovereignty is no longer adequate, and that present institutions are not able to cope and must be supplemented by many more international agencies managing common resources. The Commission feels that there should be a bigger role in environment for science and the NGOs (Non-governmental Organizations for those without their handy list of acronyms). There is a call for new international law to ensure proper environmental protection, and most radically, the report declares that military security is meaningless without ecological security.

Of course the solutions will take money — pots and pots of money — but there is an answer for that problem too. In a series of comparisons, we learn that to implement, for instance, the UN Action Plan for desertification would take less cash than two days of world military spending.

That all the members of the Commission could unanimously support this report gives some hope that its recommendations might be achieved. We must decide for ourselves if it is hopeless idealism, or a viable path to an ecologically sound future for the world's peoples. The publisher says "this is the most important document of the decade on the future of the world". He could well be right, but its uninspired writing could cause it to miss some of its intended audience.

The world's environmental problems are the sum total of many individual ones, but a single problem can seem as difficult to solve. Andy Russell's **Life of a River** is a good read, presenting a story of the Oldman River region from Ice Age times to the present controversy.

The prehistoric life of the region is imaginatively pictured; unfortunately the story hangs on dates which have either never received wide acceptance or have now been abandoned by archaeologists. The more recent life of the Indians is more reliably described, and the settlement period, illuminated by Russell's own memories and recollections of old timers includes some enjoyable storytelling. The beauty of the region is described in words, but not, alas, in pictures.

There is not a lot about the river until the last section, when Russell discusses the Oldman dam now being built. His perspective is that of a long time resident who loves the area and has been a leader in the local opposition to the dam. He tells us how hints and rumors of a possible dam appeared and disappeared, discusses earlier (and abandoned) schemes, and the development of local opposition by the Peigans and farmers.

Russell discusses the logic and reality of dams in a wide-ranging section about dams from the U.S. to the Nile. He criticizes the dam from a diversity of perspectives including its geological basis, the management of the Oldman basin, its proposed uses for irrigation, and its likely future siltation. The arguments advanced for the dam are not discussed in any detail, so this is not so much an objective discussion of the dam and its rationale as a passionate personal appeal to reconsider the project before it is too late.

Russell is in tune with the Brundtland recommendations when he points out the difficulty of taking into account the environmental, social and spiritual costs of such a construction project, and urges that these be reckoned into the accounting. The Oldman dam is a classic example of the problems of balancing local and wider interests, short-term and long-term needs. The reader may well want to ask if the Oldman Dam will help us to a sustainable future in Alberta, but will have to look beyond Russell's book for the information.

AROUND THE PROVINCE a review by Gail Helgason

Edmonton searches again for new dump

The City of Edmonton's seven-year search for a new dump site is expected to end this spring.

"By the first of May, we should have a site," says Francis Hugo, manager of Waste Management Projects with the City of Edmonton's Water and Sanitation Department.

New sites now being considered are in the County of Strathcona, the Municipal District of Sturgeon, the Enoch band reserve and on several locations offered by private industry.

"We are confident it will be the best site, taking in a combination of factors, including technical, environmental and social concerns."

The search for another location began last December. It followed months of controversy over the County of Lamont site, which was originally selected last fall. The Lamont option would have cost $12 million more than a site in northeast Edmonton, and $8 million more a year in operating costs.

The proposal was widely rejected by the public. The city's Citizen Action Centre, for example, logged 770 calls over the Lamont location within three days of its selection. Seventy-eight per cent were opposed.

Hugo said the department has learned a lesson from the public response generated by the Lamont site, which filled the technical requirements sought by the city.

"We've been looking for the most technically feasible means, and saying: 'Let's live with that.'"

This time, the department is taking "a completely different approach".

"We're gathering all the technical information and saying: 'Let the public and the politicians decide'."

Although the format for public participation has not been fully worked out, public hearings or small working groups will likely be established this spring to review various options.

Highway opening sparks controversy

The decision by the provincial cabinet to keep Kananaskis Highway 40 open to Feb. 29 this winter has angered environmentalists who fear further disruption of the area's elk habitat.

"We see it as just a face-saving move by the government that they will not close the highway," says Vivian Pharis, president of the Alberta Wilderness Society (AWA).

The controversy surrounds a 50-kilometre stretch of Highway 40 between Highwood Junction and the turnoff to Kananaskis Lakes in Peter Lougheed Provincial Park. The road has traditionally been kept closed between Dec. 1 and June 15 to protect a herd of elk which

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Around the Province continued

winters in the region. This year, the Alberta cabinet decided to keep the road open as an alternative route to Mount Allan during the Winter Olympics.

The AWA's fears were realized within a few weeks, when three elk were slain along the highway. Two persons were later arrested in connection with the deaths.

The association then launched a legal battle to have the road closed in January. However, Mr. Justice Donald Medhurst of Court of Queen's Bench in Calgary overturned the bid, stating that it was not for him to decide whether the decision was right or wrong, but only whether cabinet was on sound legal grounds in making the decision.

Pharis says the cabinet move shows that the government has no regard for the Kananaskis Country Integrated Resource Plan. That document, which was approved in March, 1986, endorsed the annual winter closure.

"Basically it's just a sign of flagrant disregard for wildlife and for integrated planning."

An official with the provincial Fish and Wildlife Division, however, says the decision to keep the road open was primarily based on safety considerations. A major snowstorm during the Olympics could have had serious consequences, says Peter Kinnear, executive assistant to Forestry, Lands and Wildlife Minister LeRoy Fjordbotten.

He notes that the division responded quickly to the elk slaying. Charges were quickly laid, and day and night patrols instituted along the road.

Fish and Wildlife had previously established a "mitigation program" designed to minimize wildlife disturbance from the road opening. The region has been declared a wildlife control area, with public access restricted to automobile through-traffic. Feeding areas were also instituted away from the road.

Pharis says it is "very obvious" that the government wants the highway open from now on.

Kinnear, however, says a final decision has not been made on whether the highway will be open in subsequent years.

ENVIRONMENT UPDATE

Hazardous Goods: the Banff Workshop

On June 26-29, the Banff Centre School of Management is offering a workshop for people affected by the legislation related to the manufacture, transportation, use and disposal of hazardous materials. The workshop will examine recent legislation and develop recommendations for a course of action.

For further information, contact Felicity Edwards at PO Box 1020, Banff T0L 0C0 or call 762-6137.

Environmental Decision-making

Seeking Consensus — The Public's Role in Decision-making is the theme of the 1988 symposium of the Alberta Society of Professional Biologists and the Alberta Chapter of the Canadian Society of Environmental Biologists, to be held at the Westin Hotel in Edmonton April 26 and 27. It will focus on the roles of the public and of environmental groups in influencing government decisions, and on the importance of communications. Speakers will represent industry, government, education, the media and environmental organizations. To register or for information, call Nicola Ross in Calgary 269-6886 or Brian Free in Edmonton at 427-5792. Or write to the CSEB, Box 12, Substn 11, Edmonton T6G 2E0.

Remembering Bob Lister

In a joint project with the Edmonton Bird Club, the Tofield Municipal Library has opened a special collection in memory of the late Robert Lister, a well known ornithologist who had a 50-year career as a naturalist, including several years as a bird columnist for the *Edmonton Journal.* The collection focuses on birds, wildlife and conservation. The library is seeking donations of books, periodicals, pamphlets etc. on these topics. Contact Elizabeth Hubbard, Tofield Municipal Library 662-3838.

If you have a short news item of province-wide interest you'd like to contribute to Environment Update, please send it to the editor at the address on the Contents page. The editor reserves the right to select and edit the items.